

## **Micro-fabrication and characterization of composite meta-materials designed for 100 GHz operation regime**

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We report the micro-fabrication and measured transmission spectra of composite meta-material (CMM) structures consisting of periodically stacked split-ring resonator (SRR) and wire layers particularly designed for operation around 100 GHz. The layers forming the meta-material are fabricated on glass substrates by using standard photolithography, metal deposition, and lift-off techniques. By employing an experimental setup constructed around a network analyzer, two microwave sources, a frequency multiplier, and a mixer, the transmission spectra of SRR-only, wire-only, and CMM structures are measured and reported in the 75-120 GHz frequency range. The SRR-only structure displays a  $\mu < 0$  transmission dip around 100 GHz, and the wire-only structure displays a stop band which extends up to  $\sim 115$  GHz. We will be reporting our ongoing efforts towards obtaining a CMM transmission band in the anticipated  $\mu < 0$ ,  $\epsilon < 0$  regime.